

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor Rickie C. Lake, et al
Assignee Micron Technology, Inc.
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Priority Examiner D. Hamlin
Attorney's Docket No. MI40-327
Title: An Epoxy, Epoxy System, and Method of Forming a Conductive Adhesive
Connection

PRELIMINARY AMENDMENT

To: Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

From: James E. Lake (Tel. 509-624-4276; Fax 509-838-3424)
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AMENDMENTS

In the Specification

Page 1, after the title, insert:

-CROSS REFERENCE TO RELATED APPLICATION

This patent resulted from a Continuation of U.S. Patent Application Serial
No. 09/392,073, filed September 8, 1999, which is a Divisional of U.S. Patent
Application Serial No. 09/032,262, filed February 27, 1998.--

EL 465782735

In the Claims

Cancel claims 1-44 and add new claims 45-68 as follows.

45. An epoxy comprising:
a liquid mixture of a hardener and a base epoxy resin; and
a concentration of a lithium salt within the liquid mixture, the
concentration of lithium salt being high enough that a 15 mil length sample of
the liquid mixture having cross-sectional dimensions of 50 mil by 2 mil exhibits
a resistance of less than about 100 ohms along its length while exhibiting a
viscosity of less than 100,000 cps.

46. The epoxy of claim 45 wherein the lithium salt is $\text{LiN}(\text{CF}_3\text{SO}_2)_2$.

47. The epoxy of claim 45 wherein the lithium salt is LiAsF_6 .

48. The epoxy of claim 45 further comprising silver particles.

49. An epoxy comprising:

a liquid mixture of a hardener and a base epoxy resin;

silver particles; and

$\text{LiN}(\text{CF}_3\text{SO}_2)_2$ as an ionic salt, a concentration of the ionic salt within the liquid mixture being high enough that a 15 mil length sample of the liquid mixture having cross-sectional dimensions of 50 mil by 2 mil exhibits a resistance of less than about 100 ohms along its length while exhibiting a viscosity of less than 100,000 cps.

50. A method of forming a conductive adhesive connection comprising:

forming a liquid epoxy mixture of a first liquid comprising a hardener and a second liquid comprising a base epoxy resin, the liquid epoxy mixture having a concentration of a lithium salt high enough that a 15 mil length sample of the liquid epoxy mixture having cross-sectional dimensions of 50 mil by 2 mil exhibits a resistance of less than about 100 ohms along its length while exhibiting a viscosity of less than 100,000 cps;

while exhibiting the resistance of less than about 100 ohms and the viscosity of less than 100,000 cps, providing the liquid epoxy mixture between first and second electrical nodes to form a conductive connection therebetween; and

curing the liquid epoxy mixture.

51. The method of claim 50 wherein the lithium salt is $\text{LiN}(\text{CF}_3\text{SO}_2)_2$.
52. The method of claim 50 wherein the lithium salt is LiAsF_6 .
53. The method of claim 50 wherein the liquid epoxy mixture further comprises silver particles.
54. The method of claim 50 wherein the first and second electrical nodes are comprised respectively by an integrated circuit chip and a battery.
55. A method of forming a conductive adhesive connection comprising:
forming a liquid epoxy mixture of a first liquid comprising a hardener, a second liquid comprising a base epoxy resin, and silver particles, the liquid epoxy mixture having a concentration of $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ as an ionic salt high enough that a 15 mil length sample of the liquid epoxy mixture having cross-sectional dimensions of 50 mil by 2 mil exhibits a resistance of less than about 100 ohms along its length while exhibiting a viscosity of less than 100,000 cps;
while exhibiting the resistance of less than about 100 ohms and the viscosity of less than 100,000 cps, providing the liquid epoxy mixture between first and second electrical nodes to form a conductive connection therebetween; and
curing the liquid epoxy mixture.

56. A method of forming a conductive adhesive connection comprising:
mixing a first liquid with a second liquid to form a liquid conductive epoxy mixture, the first liquid comprising a hardener and the second liquid comprising a base epoxy resin; the liquid conductive epoxy mixture comprising a lithium salt and having sufficient conductivity that a 15 mil length sample of the liquid conductive epoxy having cross-sectional dimensions of 50 mil by 2 mil has a resistance of less than about 100 ohms along its length while having a viscosity of less than about 100,000 cps;
providing the liquid conductive epoxy mixture between first and second electrical nodes to form a conductive connection between an integrated circuit chip and a battery; and
curing the liquid conductive epoxy mixture.

57. The method of claim 56 wherein the conductive epoxy mixture further comprises silver particles.

58. The method of claim 56 wherein the lithium salt comprises a lithium imide salt.

59. The method of claim 56 wherein the lithium salt comprises one or more salts selected from the group consisting of LiAsF_6 and $\text{LiN}(\text{CF}_3\text{SO}_2)_2$.

60. The method of claim 56 wherein the lithium salt is $\text{LiN}(\text{CF}_3\text{SO}_2)_2$.

61. The method of claim 56 wherein the lithium salt is LiAsF_6 .

62. The method of claim 56 wherein the 15 mil length sample exhibits the resistance within at most about 30 minutes after the first and second liquids are mixed and while having a viscosity of less than about 100,000 cps.

63. The method of claim 62 wherein the 15 mil length sample exhibits the resistance within at most 10 minutes.

64. The method of claim 56 wherein the liquid conductive epoxy mixture viscosity remains less than about 100,000 cps for longer than 10 minutes after the first and second liquids are mixed.

65. The method of claim 56 wherein the liquid conductive epoxy mixture remains a liquid for longer than 10 minutes after the first and second liquids are mixed.

66. The method of claim 56 wherein the liquid epoxy mixture is formed by combining the first and second liquids with a third liquid, the third liquid comprising the lithium salt.

67. The method of claim 66 wherein the lithium salt is completely dissolved in the third liquid prior to combining the third liquid with the first and second liquids.

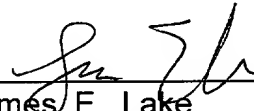
68. The method of claim 56 wherein the liquid epoxy mixture is formed by combining the first and second liquids with a third liquid, the third liquid comprising a thinner selected from the group consisting of aliphatic glycidyl ethers and aromatic glycidyl ethers, the ionic salt being a lithium salt present in the third liquid to a concentration of from about 0.5 molar to about 1.2 molar prior to combining the third liquid with the first and second liquids.

REMARKS

This application is a continuation application of U.S. Patent Application Serial No. 09/392,073. Claims 1-44 have been cancelled and new claims 45-68 have been added. Examination on the merits is requested. The Undersigned is available during normal business hours (Pacific Time Zone)

Respectfully submitted,

Dated: 25 Apr 2001

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